

1       **51034/SDB/M60**

WHAT IS CLAIMED IS:

- 5           1.    A multiple spray nozzle apparatus comprising:  
a plurality of humidifying tubes, each tube comprising:  
          a tube,  
          a plurality of holes through a wall of the tube,  
each hole being in the range of from about 10 to 100  
10          micrometers diameter, and  
          each hole having a length through the wall in the  
range of from about 20 to 200 micrometers; and  
          means for introducing high pressure water into each  
tube.
- 15          2.    Apparatus according to claim 1 wherein each hole has  
a diameter in the range of from about 20 to 200 micrometers  
and each hole has a length through the wall in the range of  
from about 40 to 400 micrometers.
- 20          3.    Apparatus according to claim 1 wherein the tubes are  
arrayed across the cross section of an air flow duct, and  
further comprising means for passing a flow of air through the  
duct.
- 25          4.    Apparatus according to claim 1 wherein the wall of  
the tube is locally thinned adjacent each hole.
- 30          5.    Apparatus according to claim 4 wherein the local  
thinning of the wall comprises a larger hole through a wall of  
the tube and a smaller hole through a patch secured to the  
wall of the tube.
- 35          6.    Apparatus according to claim 1 comprising a water  
delivery manifold and wherein at least a portion of the tubes

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are arranged between a pair of water supply pipes of the manifold.

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7. Apparatus according to claim 1 comprising a water delivery manifold and wherein at least a portion of the tubes extend laterally from a water supply pipe of the manifold.

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8. Apparatus according to claim 1 comprising a water delivery manifold and wherein at least a portion of the tubes extend laterally from opposite sides of a water supply pipe of the manifold.

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9. Apparatus according to claim 1 comprising an impact surface outside at least a portion of the holes.

10. A multiple spray nozzle apparatus comprising:

a tube,

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a plurality of holes through a wall of the tube, each hole being in the range of from about 10 to 100 micrometers diameter, and

each hole having a length through the wall in the range of from about 20 to 200 micrometers.

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11. Apparatus according to claim 10 wherein each hole is in a thinned portion of the tube wall.

12. Apparatus according to claim 10 wherein the wall of the tube is locally thinned adjacent each hole.

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13. Apparatus according to claim 10 wherein each hole is in the bottom of a counterbore in the tube wall.

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14. Apparatus according to claim 10 wherein each hole is in a patch on the tube wall, the patch being thinner than the tube wall.

15. A multiple spray nozzle apparatus comprising:  
a plurality of humidifying tubes arrayed across a cross  
5 section of an air duct, each tube comprising:

a tube, and

a plurality of holes through a wall of the tube, the  
holes being sufficiently small to emit fog droplets; and  
means for introducing high pressure water into each tube,  
10 wherein the tubes and holes are sufficiently close together  
for mixing fog droplets from the holes with at least 80% of  
the air flowing through a cross section of the duct within  
about one half meter downstream from the holes.

15        16. Apparatus according to claim 15 wherein each hole is  
in a thinned portion of the tube wall.

17. Apparatus according to claim 15 wherein the wall of  
the tube is locally thinned adjacent each hole.

20        18. Apparatus according to claim 15 wherein each hole is  
in the bottom of a counterbore in the tube wall.

19. Apparatus according to claim 15 wherein each hole is  
in a patch on the tube wall, the patch being thinner than the  
25 tube wall.

20. A multiple spray nozzle apparatus comprising:  
a tube,  
a plurality of holes through a wall of the tube, each  
hole being in a locally thinned portion of the hole wall.  
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21. Apparatus according to claim 20 wherein each hole is  
in the bottom of a counterbore in the tube wall.

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22. Apparatus according to claim 20 wherein each hole is  
in a patch on the tube wall, the patch being thinner than the  
5 tube wall.

23. A multiple spray nozzle apparatus comprising:  
a tube;  
a plurality of larger holes through a wall of the tube;  
10 patch on the tube wall covering each larger hole, each  
patch being thinner than the tube wall; and  
a smaller hole through each patch.

24. A multiple spray nozzle apparatus comprising:  
a tube;  
15 a plurality of counterbores in the tube wall; and  
a hole through the tube wall at the bottom of each  
counterbore.

25. A multiple spray nozzle apparatus comprising:  
20 a tube;  
a plurality of patches on the tube wall, each patch being  
thinner than the tube wall; and  
a hole through the patch.

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